Redevelopment of Highway Service Centre Pheasants Nest (M31)

Stormwater Management Report

Prepared for: Ampol (c/o MostynCopper)

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Revision

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Contents

Acronyms

Acronym	Definition	Details
AEP	Annual Exceedance Probability	
AHD	Australian Height Datum	
ARI	Annual Recurrence Interval	
ARR	Australian Rainfall & Runoff (1987)	
DA	Development Application	
DCP	Development Control Plan	
Ha	Hectare	
FPL	Flood Planning Level	
LEP	Local Environment Plan	
LG	Local Government	
MUSIC	Model for Urban Stormwater Improvement Conceptualisation	WSUD software by eWater
PMF	Probable Maximum Flood	
SEI	Stream Erosion Index	
SMR	Stormwater Management Report	This report
Stantec	Stantec Australia Pty Ltd	
WSUD	Water Sensitive Urban Design	

1. Introduction

Ampol Limited/ Caltex (the Client) and Transport for NSW (RMS) have entered into two Project Delivery Agreements to redevelop and innovate the existing highway service centres at Pheasants Nest. The redevelopment works are required and defined to enhance the experience for customers whilst enabling and encouraging safe and efficient journeys throughout NSW.

Stantec have been commissioned by Ampol Limited (c/o MostynCopper) to prepare this Stormwater Management Report for the proposed development at Highway Service Centres, Hume Highway, Pheasants Nest NSW 2574.

The SMR outlines the conceptual stormwater design for the proposed development and demonstrates the application of water sensitive urban design principles and compliance with Wollondilly Shire Council (the Council) requirements.

2. Site Characteristics

2.1 Site Details

Site Address Northbound and Southbound
Hume Highway, Pheasants Nest NSW 2574

Property Description Lot 1 DP 1147096;
Lot 2 DP 1147096; and
Lot 12 on DP773041

The Sites are located within Wollondilly Shire Council's jurisdiction. As shown in Figure 1, the site is bounded by:

- Existing bushland and vegetated areas around the sites;
- Hume Motorway running in between the two sites; and with the
- Southbound site located adjacent to Upper Nepean State Conservation Area.

Figure 1 - Locality Plan (Source: maps.six.nsw.gov.au, 2020)

Using publicly available Lidar contour information, it can be inferred that the Northbound site is relatively gently graded. It falls generally from south to north ultimately discharging onto an existing regional basin north of the site.

The Southbound site is relatively flatter. It falls generally from south to north ultimately discharging onto an existing swale channel adjacent to Hume Highway.

Pheasants Nest Highway Service Centres Flooding Constraints Assessment (Eco Logical Australia 2017) suggests that the study area is elevated in relation to its surrounding water courses, namely Nepean River and Carters Creek, but is lower as compared to the bushland directly east of the site.

2.2 Existing Catchment Analysis

The application site is located at either side of the M31 Hume Highway and is part of the Carters Creek catchment which runs in direction south-west to north-east at the north of the proposed development. A GIS analysis was undertaken using the 1 m grid LIDAR information extracted from ELVIS - Elevation and Depth - Foundation Spatial Data. The existing drainage patterns of the area is shown in the figure 2 where it has been identifying the main flow streams, five catchment and two existing ponds located in the vicinity of the area. Catchment S1 does not form part of the Sydney Water Catchment zone (Refers Appendix A for details).

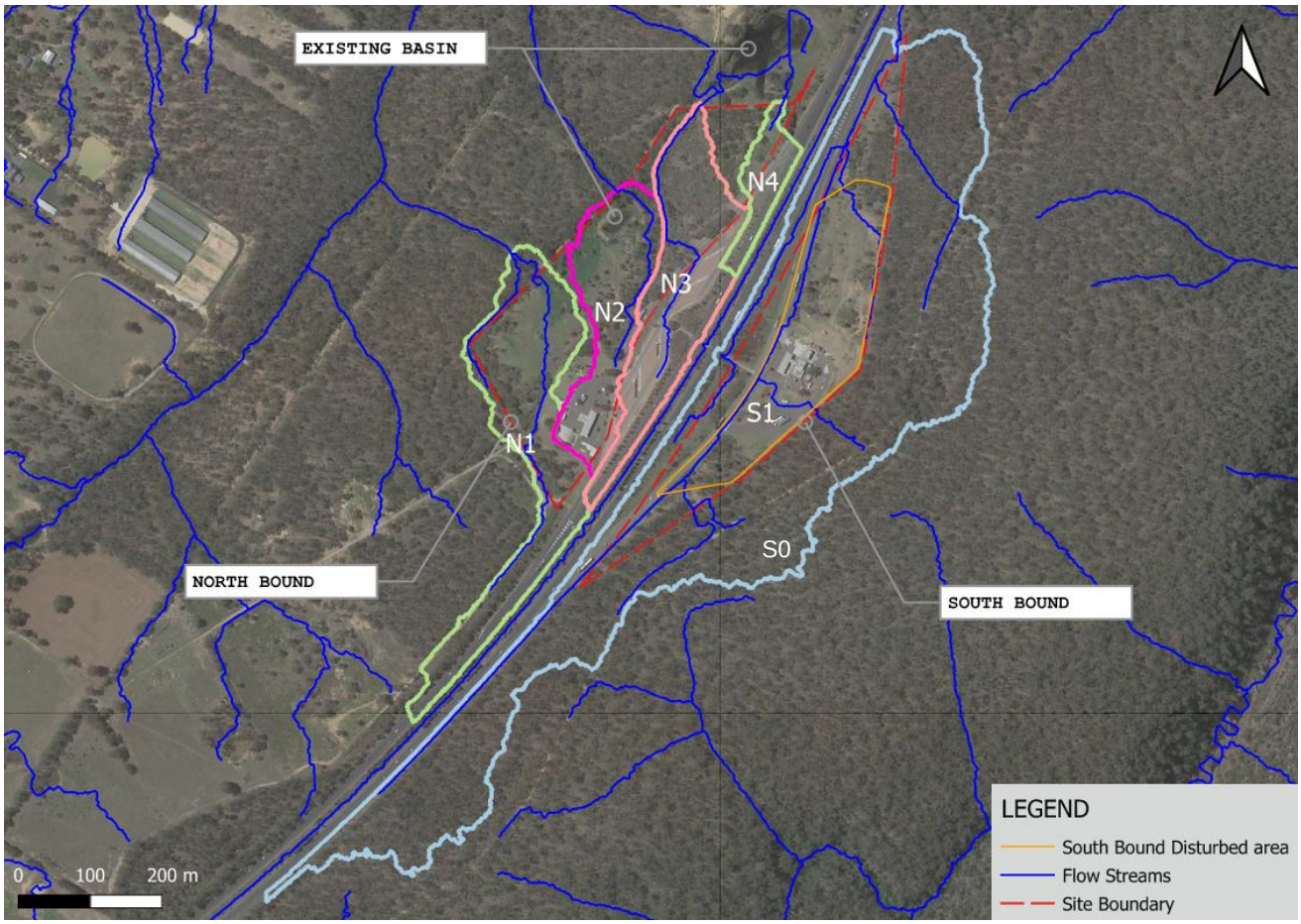


Figure 2: Existing Catchment

The north bound is formed by 4 sub-catchments and some remaining areas which drain further north of the property boundary. The proposed project will affect only the sub-catchments N1 and N2 which will cover pretty much the entire development. Modifications in N3 and N4 are null or negligible and will not be further considered in this report.

The south bound consist of one big catchment which drains in direction south to north. In this case the existing and future catchment areas will remain the same but there will be a significant increase in the impervious fraction of the site.

2.2.1 HYDROLOGY

In order to set the design parameter for the proposed development, a hydrological analysis was performed in DRAINS to identify the relevant hydraulic parameters of the existing drainage system.

The time of concentration was defined using the kinematic wave equation as:

$$t = \frac{6.94\,(L.n^*)^{0.6}}{I^{0.4}.\,S^{0.3}}$$

Where:

- t = Time of concentration [min]
- L = overland flow length [m]
- n*= Roughness Coefficient
- S = average overland flow path slope
- I = rainfall intensity (1% AEP) [mm/h]

The extension of the fraction pervious and impervious of each sub-catchment as well as the required parameter for the equation were defined using LIDAR information. The table below summarised the results obtained in DRAINS for each catchment as well as the used parameters.

Existing External Catchment Analysis									
North Bound									
Catchment ID	Catchment [Ha]	Impervious [Ha]	Impervious [%]	Tc [min]	Pervious [Ha]	Pervious [%]	Tc [min]	Flow 1% [m3/s]	Flow 5% [m3/s]
Ext - N1	5.0841	1.0389	20%	8	4.0452	80%	19	2.09	1.41
Ext - N2	3.0936	0.9877	32%	5	2.1059	68%	8	1.88	1.32
Ext - N3	4.0995	2.0941	51%	7	2.0054	49%	8	2.49	4.75
Ext - N4	0.9236	0.4457	48%	4	0.4779	52%	9	0.549	0.373
South Bound									
Ext – S0	26.4529	2.6934	10%	6	23.7595	90%	22	8.38	6.86
Ext – S1	4.5889	1.1954	26%	5	3.3935	74%	17	2.05	1.38

Table 1: Existing External Catchment Analysis

The proposed stormwater strategy is seeking to maintain the peak flows for the design rainfall to the pre-development conditions values at the boundary points. Given the complexity of the external catchment Ext – S1, the analysis for the maximum allowable discharge for the south bound has been limited to the disturbed area only.

Pre-development flows have been calculated to define the permissible discharge for each catchment. These are summarised in Table 6.

Catchment ID	Area [Ha]	Permissible Discharge 1% AEP [m3/s]	Permissible Discharge 5% AEP [m3/s]
N1	5.08	2.09	1.41
N2	3.09	1.88	1.32
S1	4.59	2.05	1.38

Table 2 – Pre-Development Runoff

3. Council Controls

3.1 Overview

The Site is subject to the following planning and legislative controls:

- Wollondilly Shire Council Subdivision and Engineering Standard
- Draft Integrated Water Management Strategy Wollondilly Shire Council
- Applicable Australian Standards, in particular AS 3500, AS 3600, AS 3725 & AS 4058
- NSW MUSIC Modelling Guidelines

The Site is also subject to the following engineering controls, guidelines and reference documents:

- Australian Rainfall and Runoff Volumes 1 & 2;
- Water Sensitive Urban Design Technical Guidelines for Western Sydney.

Particular note is made of the report:

- Eco Logical Australia 2017. Pheasants Nest Highway Service Centres Flooding Constraints Assessment. Prepared for Coffey on behalf of RMS.

3.2 Stormwater Quantity

Following the stormwater drainage design guidelines outline on Wollondilly Shire Council Subdivision and Engineering Standard, the drainage functional requirements are as follows:

- Stormwater drainage system for the site will be composed of multiple rainwater gardens/ bio retention swales and pit & pipe system that ultimately drain toward bio-retention basins within the site.
- It is a functional requirement to ensure that the proposed development has neutral or beneficial effect to the water quantity & water quality of the areas adjacent and downstream the site.

Design Input
Proposed catchment area and fraction pervious/impervious.
ARI for minor events - 20years for commercial/industrial property drainage
AEP ARI for major event – 100years
A minimum freeboard of 0.5m shall be provided between the 100 year flood level and floor levels on structures.
The minimum slope of the basin floor in a dry basin is 1%.

Table 3: Drainage Design Inputs

3.3 Water Sensitive Urban Design

The Wollondilly Shire Council Subdivision and Engineering Standard outlines the following stormwater quality targets. Targets are expressed as the reduction in pollutant loads required when compared to an equivalent development with no stormwater control measures included.

It is a functional requirement to ensure that the proposed development has neutral or beneficial effect to the water quality of the areas adjacent and downstream the site. Water Sensitive Urban Design (WSUD) principles shall be incorporated into landscape design whenever possible and appropriate.

Water quality design input is to treat gross pollutants and course sediment to a flow rate of 60L/s/ha.

Pollutant	Description	Treatment Objective
Gross Pollutants	Trash, litter and vegetation larger than 5 mm	70% of the load
Coarse Sediment	Contaminant particles between 0.1 mm and 5 mm	80% of the load
Fine Sediment	Contaminant particles 0.1 mm or less	50% of the load
Nutrients	Total phosphorus Total nitrogen	45% of the load 45% of the load
Hydrocarbons, motor oils, oil & grease.		Whichever is greater: 1. 90% of the load; or 2. Total discharge from site of Total Petroleum Hydrocarbons (TPH) <10 mg/L at all times.

Table 4: Stormwater Quality Objectives

3.4 Stormwater Conveyance

The on Wollondilly Shire Council Subdivision and Engineering Standard specify the following required design storm events when designing minor and major drainage systems:

Design Parameter	Design Storm (Annual Recurrence Interval)	Design Storm (Annual Exceedance Probability)	Conveyance Method
Minor Drainage System (Commercial/ Industrial property drainage)	20 years	5%	In Ground (Piped)
Major Drainage System (All)	100 years	1%	Overland

Table 5: Stormwater Conveyance Design Criteria

4. Proposed Development

The existing service stations are to be redeveloped as per the layouts shown on Appendix B.

Catchments for the proposed development have been developed seeking to maintain the original drainage patters as much as possible. The increasing in the impervious fraction of the affected sub-catchments will be attenuated to pre-development flow through multiple detention basins. Flows from the additional impervious areas will be conducted as overland flow and by a piped system to the location of the proposed basin to then be discharged (prior treatment) to the existing natural watercourses at the property boundary in order to avoid any disturbance of the existing vegetation. A swale will bound the site to allow the upstream incoming flows to bypass the development and resume its original path.

The table 6 provides a summary of the proposed catchments.

Catchment ID	Existing			Proposed			Area Difference	Treatment Required
	Catchment [Ha]	Pervious [%]	Impervious [%]	Catchment [Ha]	Pervious [%]	Impervious [%]		
N1	5.08	80%	20%	5.39	53%	47%	7%	YES
N2	3.09	68%	32%	3.329	43%	57%	8%	YES
N3	4.10	49%	51%	3.91			-5%	NO
N4	0.92	52%	48%	0.92			0%	NO
S1	4.59	74%	26%	4.59	35%	65%	0%	YES

Table 6: Proposed Catchments

Table 6 overleaf provides an overview of the proposed post-development scenario and controls.

Catchment	General Description
North Bound N1	**Stormwater Quantity** An upstream diversion swale is proposed to be laid out just outside the extents of the development to capture any external flows prior to entering the site, diverting them around and eventually draining to the existing channel. Post-development flow of the disturbed area is detained in Basin 1 and is reduced to pre-development flow. No overflow from the basin is expected in all events up to and including the 1% AEP. Stormwater discharges is conveyed by a swale to resume its natural course into an existing channel. **Stormwater Quality** A treatment train approach is proposed consisting in three vegetated swales with pit inserts, a SPEL Puraceptor to treat water from fuel pollutant prone areas and a 509 m2 bio retention basin as end of line treatment.
North Bound N2	**Stormwater Quantity** No external flows are present in this catchment. Post-development flows are detained in basins 2 and 3 and reduced to pre-development flow. No overflow from the basins are expected in all events up to and including the 1% AEP. Stormwater discharges from both basins are conveyed by a swales to resume its natural course into an existing channel **Stormwater Quality** Two bio retention basins are provided as end of line treatment. The Basin 2 is located within the landscape area close to the south boundary of the development and has an area of 317 m2. The basin 3 of 180 m2 is located at the northern area and is part of the treatment train that consist in a Rainwater Tank and four vegetated swales with pit inserts.
South Bound S1	**Stormwater Quantity** A diversion swale runs along the south boundary to protect the development from overland flows from adjacent properties. A portion of the diversion swale drains west towards an existing low point replicating the current conditions; whereas the rest of the swale divert the upstream flows in the opposite direction bypassing the proposed basin and connecting to the existing channel at the east end of the site. Post-development flow are detained in three interconnected basins along the site and reduced to pre-development flow. No overflow from the basins are expected in all events up to and including the 1% AEP. Stormwater discharges from basin 1 is conveyed by a pipe to resume its natural course into an existing channel **Stormwater Quality** Two bio-retention basins are provided as end of line treatment. The Basin 2 is located within the landscape area close to the south boundary of the development and has an area of 320 m2. The basin 3 of 250 m2 is located at the northern area and is part of the treatment train that consist in a Rainwater Tank and four vegetated swales with pit inserts.

Table 7: Summary of Proposed Development Controls

5. Proposed Stormwater Controls

5.1 Stormwater Quantity

Hydrological analysis for the proposed development has been performed using the ILSAX drainage engine within Watercom DRAINS software. DRAINS has been utilised to assess pre-development and post-development stormwater runoff to assess the suitability of the proposed controls for the development. Figures 3 and 4 shows the DRAINS concept layout for the proposed development.

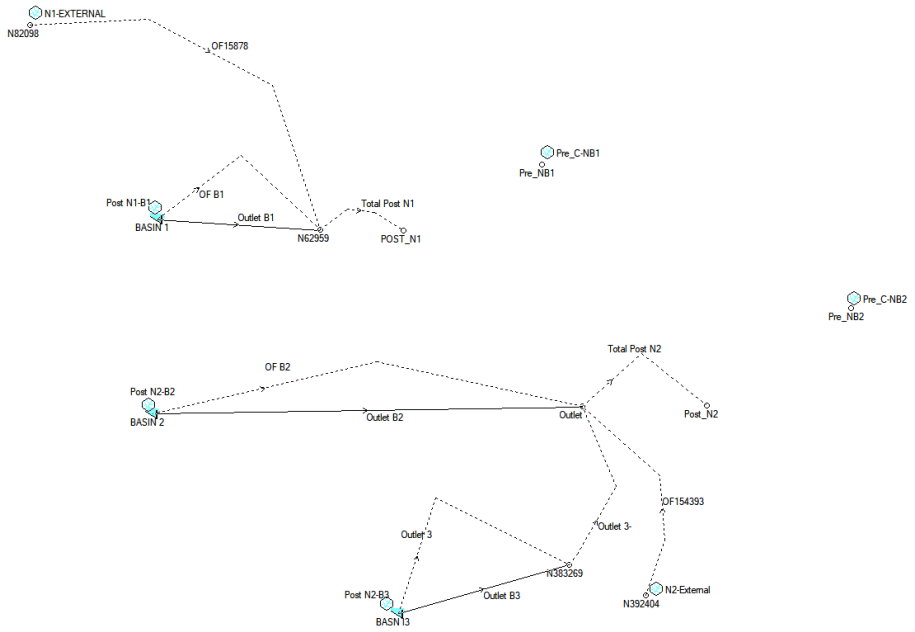


Figure 3: North Bound Drains Layout

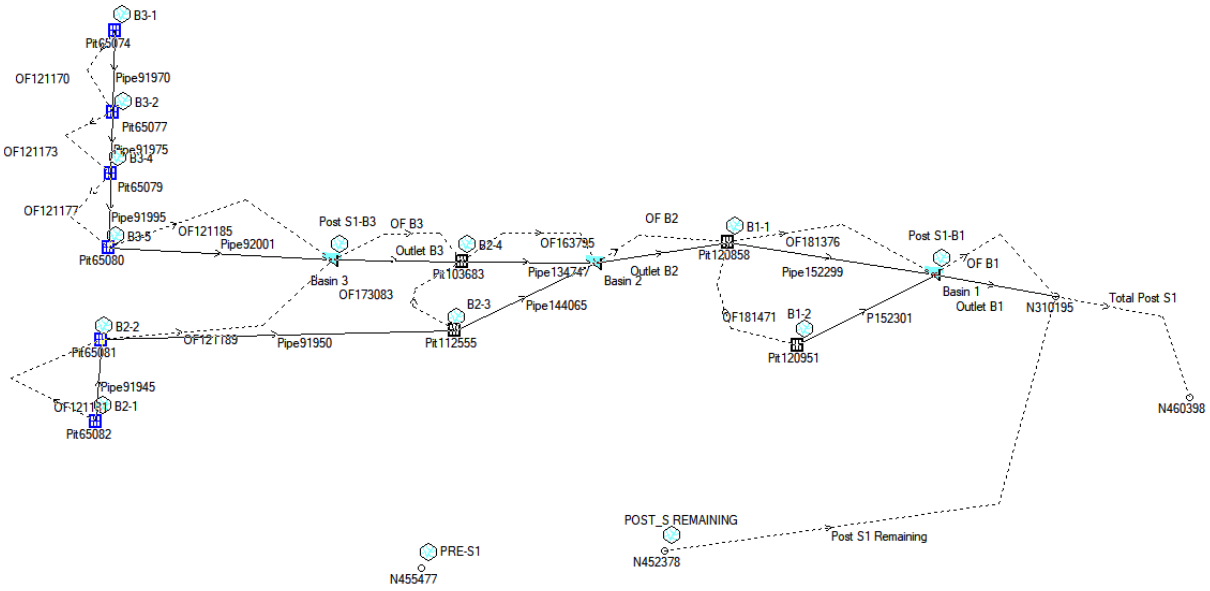


Figure 4: North Bound Drains Layout

Proposed stormwater layouts are shown on Appendix B. The stormwater network for both sites will be a combination of vegetated swales on landscape areas connected to pits & pipes system and eventually draining to bio-retention basins. Table 7 shows characteristics of each of the basins.

Basin Characteristic	Details
North Bound Basin 1	
Bio Retention Basin Footprint	760 m^2
Basin Footprint (at spillway)	1295 m^2
Basin Total Height	1.2 m
North Bound Basin 2	
Bio Retention Basin Footprint	318 m^2
Basin Footprint (at spillway)	805 m^2
Basin Total Height	1.3 m
North Bound Basin 3	
Bio Retention Basin Footprint	180 m^2
Basin Footprint (at spillway)	455 m^2
Basin Total Height	1.20 m
South Bound Basin 1	
Bio Retention Basin Footprint	725 m^2
Basin Footprint (at spillway)	1355 m^2
Basin Total Height	1.5 m
South Bound Basin 2	
Bio Retention Basin Footprint	N/A
Basin Footprint (at spillway)	580 m^2
Basin Total Height	1.35 m
South Bound Basin 3	
Bio Retention Basin Footprint	N/A
Basin Footprint (at spillway)	344 m^2
Basin Total Height	0.60 m

Table 8: Proposed Basin Characteristics

The table 9 summarise that the proposed strategy is effective in reducing the post-development flows to pre-development levels for the major and minor storm event.

Catchment ID	Area [Ha]	Permissible Discharge 1% AEP [m3/s]	Permissible Discharge 5% AEP [m3/s]	Post Development Discharge 1% AEP [m3/s]	Post Development Discharge 5% AEP [m3/s]
N1	5.08	2.09	1.41	1.92	1.29
N2	3.09	1.88	1.32	1.23	1.01
S1	4.59	2.05	1.38	1.13	1.02

Table 9: Post Development flows

5.2 Water Sensitive Urban Design

5.2.1 General Description

Council standards are consistent with best practice WSUD and require a reduction in post-development pollutant loads from those that would be discharged in an uncontrolled post-development scenario. Stormwater quality controls are required to achieve the specified reduction targets.

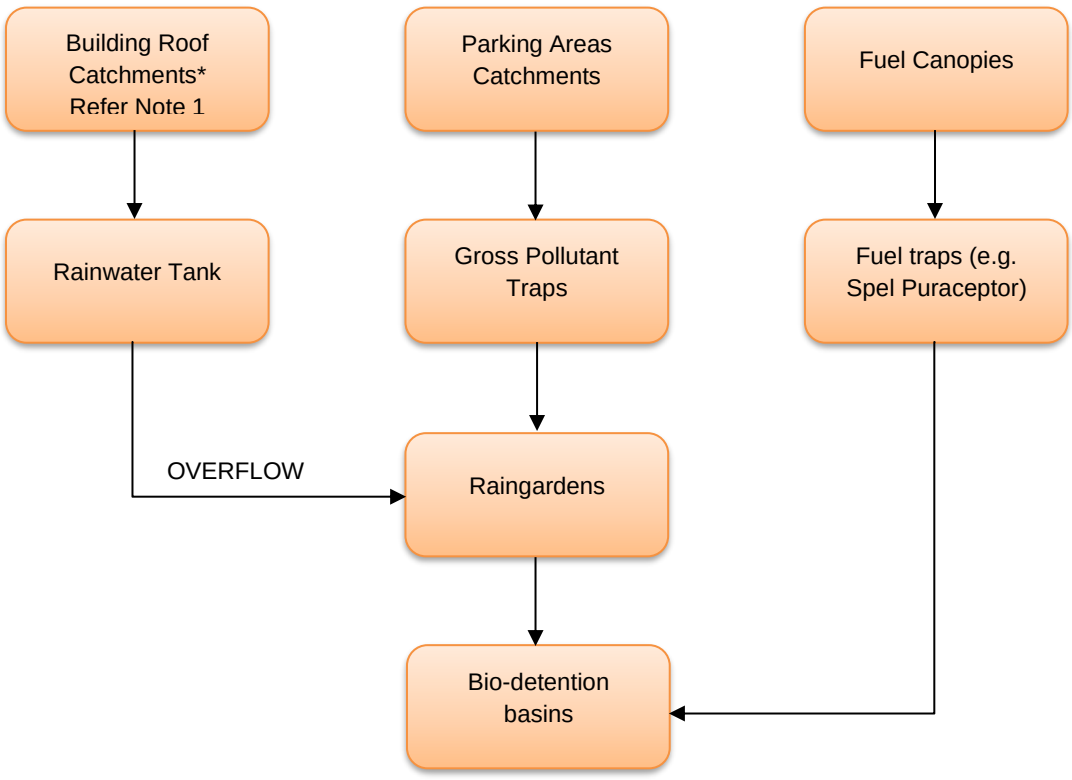
Water Sensitive Urban Design (WSUD) principles are incorporated in the design of this development whenever possible and appropriate.

Main treatment measures adopted to achieve water quality targets are as follows

- Incorporation of raingardens/ bio-swale, being grassed, to facilitate natural assimilation of water pollutants and reduce runoff;
- Use of Gross Pollutant Traps (GPT) to intercept litter and debris to maintain visual quality in downstream waterways, and to reduce the coarse sediment load on downstream water management structures.
- Use of fuel traps on fuel dispensing areas using Spel Puraceptor.
- Grade hardstand areas to allow water to penetrate garden beds with either hit & miss kerbs or flush edge and use of boulders or bollards as a form of bioretention to help manage stormwater and gradual infiltration.
- Permit runoff from paths into landscaped areas
- Create deeper planting areas and swales around the service centre buildings to help manage runoff and watering

5.2.2 Pollutant Reduction System

In order to reduce the pollutants a series of treatment devices are proposed, which together, form a treatment train. The diagram below shows the proposed treatment train for this development.



Note 1: To the extent practicable

Further discussion on each element of this treatment train is provided below.

5.2.3 Proposed Water Quality Measures

Gross Pollutant Traps (EnviroPod or approved equivalent)

Gross Pollutant Traps (EnviroPod or approved equivalent) provide effective removal of TSS and gross pollutants. EnviroPod is a filter cage system which is inserted into roadway gully pits to filter and remove pollutants before the water enters the piped drainage system. It is proposed to place EnviroPod filters within every stormwater inlet pit.

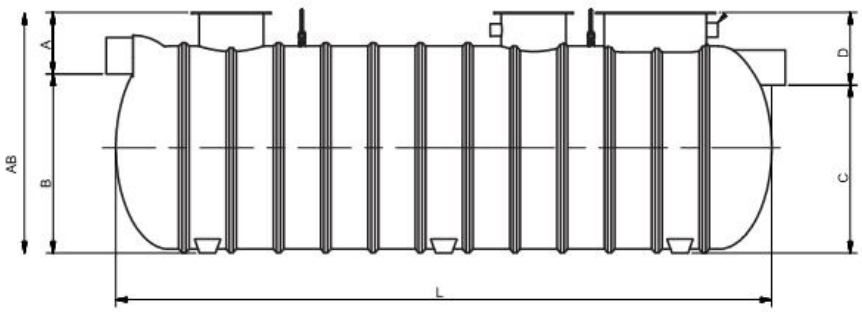
Parameters	TSS	TP	TN	GP
Input (mg/L)	100	10	10	14.8
Output (mg/L)	46	7	8.7	0
Reduction (%)	54	30	13	100

Figure 5: OceanGuard Pit Inlet Trap (Source: Stormwater 360)

Fuel Traps (Spel Puraceptor or approved equivalent)

The refuelling pad is designed to be on a raised platform along the perimeter, just under the drip line of the canopy to provide clear separation between clean and dirty water, with any fuel/oil spillage captured in the sump in between the fuel bowser and treated in the underground fuel trap the like of Spel Puraceptor, before being released to the main stormwater network.

# Key to Main Dimensions & Notes	
A	Invert Level - Depth from top of manhole to base of inlet pipe.
B	Depth from base of inlet pipe to base of tank feet.
A&B	Overall depth of tank, from top of manhole to base of tank feet.
C	Depth from base of outlet pipe to base of tank feet.
D	Invert Level - Depth from top of manhole to base of outlet pipe.
L	Overall length tank.
OD	Overall outside diameter of tank including ribs.
ID	Internal diameter of tank.
S&L	"S" is Short Series Tank & "L" is Long Series Tank.



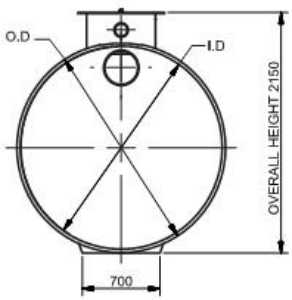


Figure 6: Spel Puraceptor

Rain Gardens & Bio-retention Basins

Promote the removal of particulate and soluble contaminants by passing stormwater water through a filter medium, either for infiltration into surrounding soils, or for collection by an underdrain. Well designed bioretention systems can provide both flow management and water quality benefits. A range of factors affect the treatment performance of the bioretention systems, including the type and composition of filter media (e.g. loamy sand), the presence and type of vegetation used, and the presence of design enhancements such as the use of a saturated zone to enhance denitrification.

Raingardens are typically small bioretention basins distributed in lots, a road reserve or open space areas to catch and treat flow at a specific location and are often vertically sided.

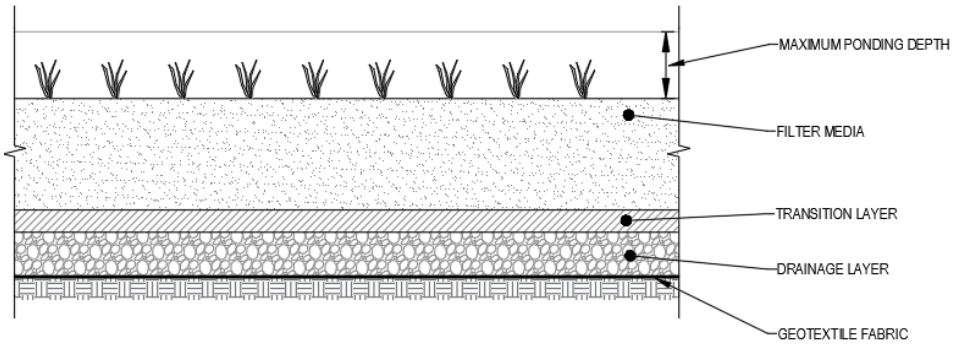


Figure 7: Raingarden typical arrangement.

Bioretention basins are typically larger basins provided in large open space areas to manage stormwater quality at the sub-catchment scale.

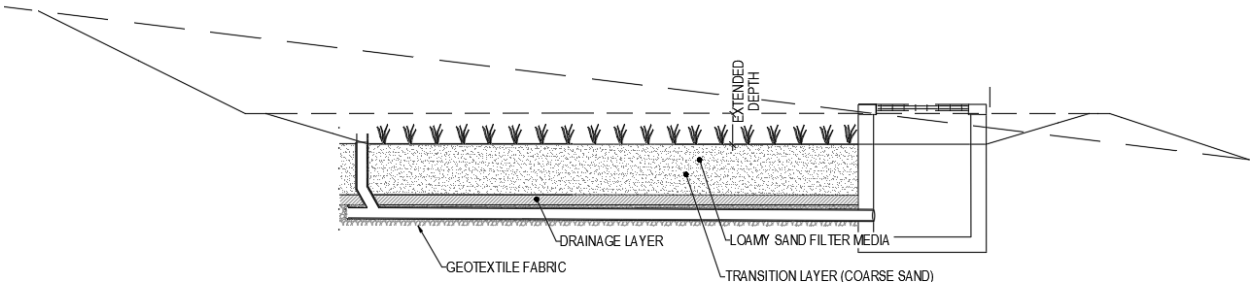


Figure 8: Bio-retention basin, typical arrangement.

Rainwater Tank

Rainwater Tanks enable reuse of roof runoff for in-house or garden use. While some settling may occur in the tank, the main contaminant removal process is the diversion of impervious area runoff to pervious areas (via garden use) or to sewer (after in-house use). Effective use of rainwater tanks can reduce the directly connected impervious area of a catchment, and help to counteract the increase in impervious area that generally accompanies urbanisation through reduction in runoff volumes.

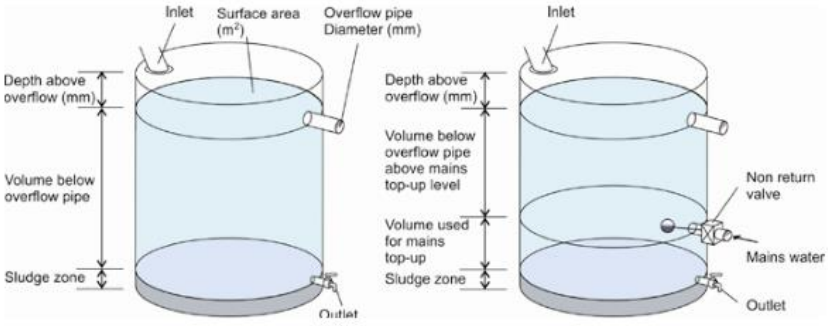


Figure 9: Rainwater Tank typical arrangement

5.2.4 Music Modelling

Stormwater quality has been modelled using 'Model for Urban Stormwater Improvement Conceptualisation' (MUSIC) software produced by eWater. MUSIC modelling has been undertaken in accordance with 'Wollondilly Shire Council Subdivision and Engineering Standard', 'Australian Rainfall and Runoff'.

The meteorology data utilized in the modelling was extracted from the Pluviograph Rainfall Data toolkit from eWater and is referred to the project closest rainfall station detailed below:

Station No: 068187
Station Name: ORANGE GVE (CATARACT C)
Latitude: -34.2833
Longitude: 150.85
Elevation: 476.0
First: 1964 02
Last: 1973 11

An excerpt of the MUSIC model prepared for the proposed development is shown in Figure 8 and 9 and further details regarding MUSIC model source and treatment nodes are included in the following tables.

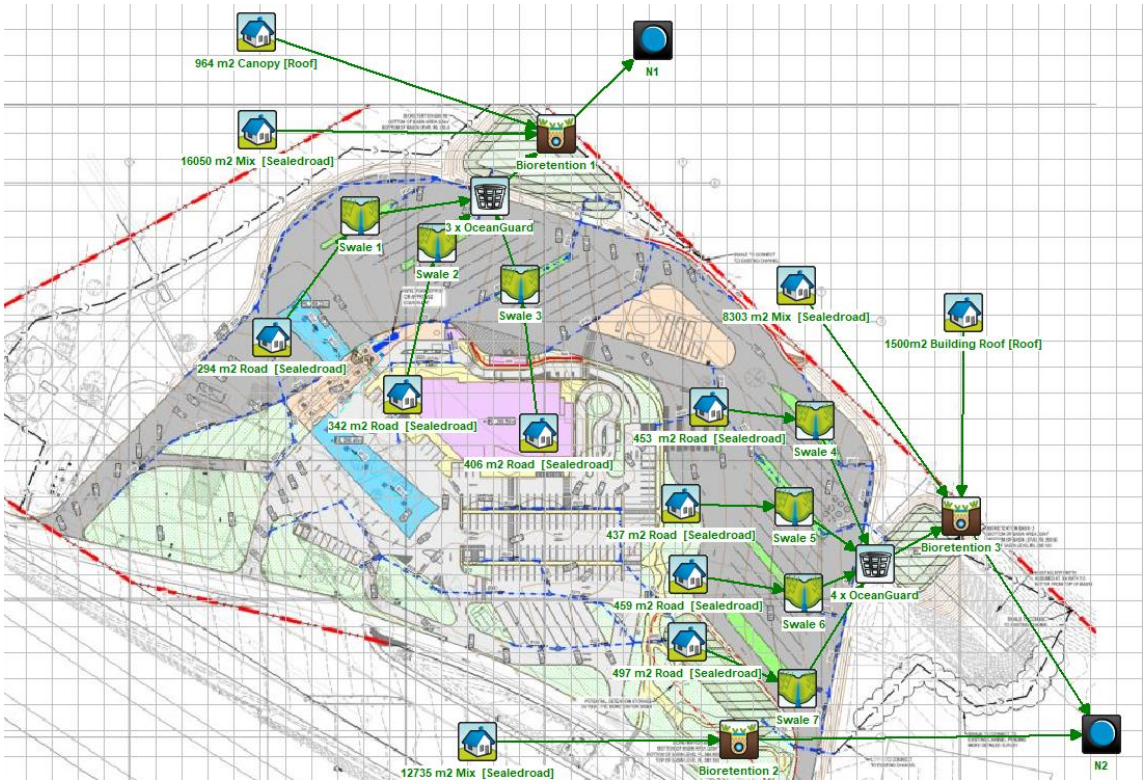


Figure 10 – North Bound - MUSIC Model Arrangement

Figure 11 – South Bound - MUSIC Model Arrangement

Table 7 illustrates the effectiveness of the proposed treatment train, for the discharge of each proposed stormwater demonstrating compliance with Council's controls.

Pollutant	Council Pollutant Reduction Target	Post-Development Pollutants - Sources (kg/year)	Post-Development Pollutants - Residual (kg/year)	Actual Pollution Reduction
North Bound N1				
Total Suspended Solids (TSS)	50%	4380	54.70	98.7%
Total Phosphorous (TP)	45%	6.7	1.56	76.7%
Total Nitrogen (TN)	45%	32.5	8.91	72.6%
Gross Pollutants	80%	337.0	0	100%
North Bound N2				
Total Suspended Solids (TSS)	50%	6340	146	97.7%
Total Phosphorous (TP)	45%	11.40	2.44	78.7%
Total Nitrogen (TN)	45%	46.70	13.90	70.3%
Gross Pollutants	80%	491.00	0	100%
South Bound				
Total Suspended Solids (TSS)	50%	12700	196	98.5%
Total Phosphorous (TP)	45%	22.3	4.57	79.5%
Total Nitrogen (TN)	45%	89	28.6	67.9%
Gross Pollutants	80%	945	0	100%

Table 10: MUSIC Treatment Train Effectiveness

It is proposed to stage the stormwater quality controls through the construction process in accordance with the steps within Table 12.

Stage	Timing of Installation	Description
1 Construction	Prior to substantial commencement of bulk earthworks	Bulk basin excavation shall occur such that basin areas may be utilised as temporary erosion and sediment control basins during construction. Runoff from the site shall be directed to the temporary basins via cut-off swales and the like.
2 Intermediate	Upon completion of civil works	Trim basin batters approximately to finished surface level. Install ultimate concrete drainage inlets and outlets. Base level of basin to match extended detention level such that there is no standing water within the basin and to provide required detention volumes. Base of basin to be graded at minimum 1% to ensure no ponding.
3 Final	Upon completion of ~80% of house building within applicable basin catchment	Remove sediment and all temporary materials (e.g. sand, turf) from the basin area. Box out base of basin to enable construction to final design. Install remaining stormwater drainage and scour protection. Install liner, drainage layer (including subsoil), transition layer and filter media and any remaining items to final engineering design. Install planting and landscaping to final landscape design.

Table 12 – Bioretention Basin Staging

6. Flood Impact Assessment

There are no publicly available existing flood maps covering the site, but a prior flood constraints assessment has been undertaken as part of the due diligence for proposed development on Pheasants Nest Highway Service Centres Flooding Constraints Assessment (prepared for Coffey on behalf of RMS). Findings of the said assessment are summarised below:

- The lack of existing flood mapping and modelling covering the site indicates that the sites are above the flood planning level and the 1:100 ARI.
- Utilising high level contour data and considering site topography in relation to elevation major creeks and rivers, the assessment implies that the study areas have a negligible risk from flooding.
- Some areas can be more susceptible to localised flooding but are deemed to be at low risk.

The Wollondilly Shire Council DCP specifies that any redevelopment shall not increase flood hazards or damage and adversely affect other properties. We believe that the stormwater measures discussed in this report are adequate to ensure adherence to this requirement.

Appendix A – Nepean River Sydney Water Catchment Plan

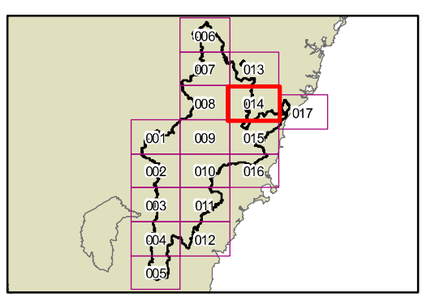
NSW GOVERNMENT | Planning

State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011 - Sydney Drinking Water Catchment Map

SDWC_014

Legend

- Subject Land
- SubCatchment Boundaries
- Local Government Boundaries
- Major Rivers
- Major Roads
- Roads



N
W E
S

0 2 4 6
Kilometers

Projection: MGA Zone 56
Datum: GDA94

Scale: 1:160,000 @ A3

Map Identification Number
SEPP_SDWC_014_20101215

Lake Burragorang

Werri Berri Creek

Little River

Nattai River

Upper Nepean River

CAMDEN COUNCIL

CAMPBELLTOWN CITY COUNCIL

WOLLONDILLY SHIRE COUNCIL

WINGECARRIBEE SHIRE COUNCIL

PROPOSED DEVELOPMENT

THE OAKS

CAMDEN

CAMPBELLTOWN

PICTON

DOUGLAS PARK

APPIN

WILTON

BUXTON

BARGO

BRINGELLY RD
THE NORTHERN RD
CAMPBELLTOWN RD
CAMDEN VALLEY WY
RABY RD
SOUTH WESTERN FWY
MINTO RD
PEMBROKE RD
NARELLAN RD
CAMDEN BYPA
CAMDEN VALLEY WY
CAMDOR RD
OLD HUME HWY
DRUITT L
BURRAGORANG RD
SILVERDALE RD
JOHN ST
MOORE ST
APPIN RD
BARKERS LODGE RD
REMEMBRANCE DR
ARGYLE ST
WILTON RD
MACARTHUR RD
HUME HWY
SOUTHERN RD
PICTON RD

Appendix B – Conceptual Stormwater Layout

REFER INSERT A

PROPOSED HEADWALL AND RIP RAP AND REGRADE AREA TO ENSURE AREA DRAIN TO HEADWALL

REMOVE EXISTING HEADWALL AND CONSTRUCT JUNCTION PIT

INDICATIVE EXISTING STORMWATER CROSSING TO BE CONFIRMED BY SURVEY

PROVIDE STORMWATER NETWORK ON EXISTING ROAD TO CONVEY FLOWS TO EXISTING OUTLET

PROPOSED GRASS SWALE REFER SHEET CV-562 FOR DETAIL (TYP.)

DETENTION BASIN 3
BOTTOM OF BASIN AREA 200m²
BOTTOM OF BASIN LEVEL RL290.25
TOP OF BASIN LEVEL RL291.85

EXISTING ELECTRICAL EASEMENT

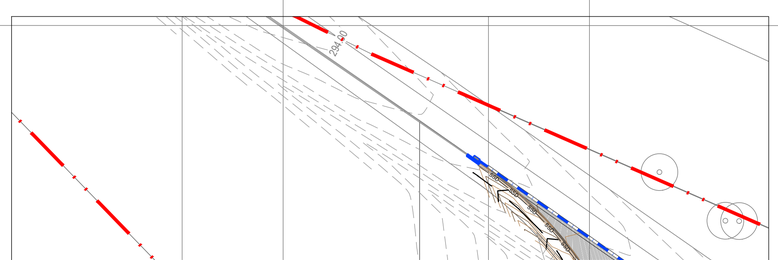
PROVIDE FENCE AROUND BASIN TO LANDSCAPE ARCHITECTS DETAIL (TYP.)

PROPOSED W-BEAM GUARDRAIL

HUME HIGHWAY NORTHBOUND

HUME HIGHWAY SOUTHBOUND

JOINS SHEET PNS-CV-062



INSERT A
SCALE 1:500

LEGEND

- PROPOSED SITE BOUNDARY
- PROPOSED BUILDING
- PROPOSED STORMWATER PIPE
- PROPOSED STORMWATER PIPE (FUEL)
- PROPOSED JUNCTION PIT
- PROPOSED GRATED PIT
- PROPOSED KERB INLET PIT
- SWALE
- SUBSURFACE DRAINAGE
- PROPOSED CONTOURS (0.25m INTERVAL)
- EXISTING CONTOURS (0.25m INTERVAL)
- PROPOSED W-BEAM GUARDRAIL
- RETAINING WALL
- KERB & GUTTER
- KERB & TOE
- SLOTTED KERB
- INTEGRAL KERB
- EXPOSED KERB
- DISHED DRAIN
- LANDSCAPE
- BIO RETENTION BASIN
- OVERLAND FLOW PATH
- PAVEMENT 1 - HEAVY DUTY RIGID PAVEMENT
- PAVEMENT 2 - LIGHT DUTY RIGID PAVEMENT
- PAVEMENT 3 - LIGHT DUTY FLEXIBLE PAVEMENT
- PAVEMENT 4 - PEDESTRIAN FOOTPATH

NOTES:
1. REFER SITEWORK DETAILS SHEET CV-461 FOR PAVEMENT AND KERB DETAILS
2. FOR MORE DETAIL INFORMATION ON GRADING, REFER STORMWATER AND CONTOUR GRADING PLANS SHEET CV-521 TO 529
3. REFER STORMWATER DETAILS, REFER SHEET CV-561 TO 562

Revisions				
F	DA - RESPONSE TO COUNCIL RFI	05.08.21	GDR	JBC
E	ISSUED FOR PRELIMINARY REVIEW	01.07.21	GDR	CPO
D	ISSUED FOR DEVELOPMENT APPLICATION	08.04.21	HHC	JDL
C	ISSUED FOR DEVELOPMENT APPLICATION	07.04.21	HHC	JDL
B	ISSUED FOR DEVELOPMENT APPLICATION	26.03.21	HHC	JDL
A	ISSUED FOR RMS APPROVAL	12.02.21	HHC	JDL
1	ISSUED FOR PRELIMINARY COSTING	17.12.20	HHC	JDL
Issue	Description	Date	Checked	Drawn

GENERAL NOTES:
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Drawing Notes

1:500 5 0 5 10 15 20 25 A1
1:1000 A3

PRELIMINARY
NOT FOR CONSTRUCTION

MGA mAHD

CONSULTANT
Stantec

Client
AMPOL

Project
REDEVELOPMENT OF HIGHWAY SERVICE CENTRE PHEASANTS NEST (M31)

Location
M31 HUME HIGHWAY
PHEASANTS NEST, NSW 2574
SOUTHBOUND

Scale @ A1
1:500

Project Number
301350044

Drawing
GENERAL ARRANGEMENT PLAN SHEET 1 OF 2

Project Code	Discipline code	Drawing Number	Issue
PNS	CV	061	F

DATE PLOTTED: 5/08/2021 4:57:35 PM BY: CHOI, JEREMY

HUME HIGHWAY NORTHBOUND

HUME HIGHWAY SOUTHBOUND

JOINS SHEET PNS-CV-061

PROVIDE STORMWATER NETWORK ON EXISTING ROAD TO CONVEY FLOWS TO EXISTING OUTLET

PROVIDE MAINTENANCE ACCESS RAMP FOR BASIN

DETENTION BASIN 2
BOTTOM OF BASIN AREA 225m²
BOTTOM OF BASIN LEVEL RL287.30
TOP OF BASIN LEVEL RL288.65

PROVIDE FENCE AROUND BASIN TO LANDSCAPE ARCHITECTS DETAIL (TYP.)

INDICATIVE EXISTING STORMWATER CROSSING TO BE CONFIRMED BY SURVEY

BREAK INTO EXISTING STORMWATER PIPE AND CONSTRUCT PROPOSED KERB INLET PIT

PROVIDE MAINTENANCE ACCESS RAMP FOR BASIN

PROVIDE FENCE AROUND BASIN TO LANDSCAPE ARCHITECTS DETAIL (TYP.)

CONNECT TO NATURAL OUTLET

BASIN EMERGENCY SPILLWAY

CONNECT TO NATURAL OUTLET

SPEL PURACEPTOR OR APPROVED EQUIVALENT

RL291.108m

RL291.605m

RL289.124m

BIORETENTION BASIN 1
BOTTOM OF BASIN AREA 720m²
BOTTOM OF BASIN LEVEL RL 286.20
TOP OF BASIN LEVEL RL 287.70

ADDITIONAL SURVEY INFORMATION NEEDED TO DESIGN MATCH EXISTING

PROVIDE 1m WIDE OVERFLOW WEIR

LEGEND

- PROPOSED SITE BOUNDARY
- PROPOSED BUILDING
- PROPOSED STORMWATER PIPE
- PROPOSED STORMWATER PIPE (FUEL)
- PROPOSED JUNCTION PIT
- PROPOSED GRATED PIT
- PROPOSED KERB INLET PIT
- SWALE
- SUBSURFACE DRAINAGE (SSD)
- PROPOSED CONTOURS (0.25m INTERVAL) (285.5)
- EXISTING CONTOURS (0.25m INTERVAL) (285.0)
- PROPOSED W-BEAM GUARDRAIL
- RETAINING WALL (RW)
- KERB & GUTTER (K&G)
- KERB & TOE (K&T)
- SLOTTED KERB (SK)
- INTEGRAL KERB (IK)
- EXPOSED KERB (EK)
- DISHED DRAIN (DD)
- LANDSCAPE
- BIO RETENTION BASIN
- OVERLAND FLOW PATH
- PAVEMENT 1 - HEAVY DUTY RIGID PAVEMENT
- PAVEMENT 2 - LIGHT DUTY RIGID PAVEMENT
- PAVEMENT 3 - LIGHT DUTY FLEXIBLE PAVEMENT
- PAVEMENT 4 - PEDESTRIAN FOOTPATH

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3. REFER STORMWATER DETAILS, REFER SHEET CV-561 TO 562

Revisions				
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C	ISSUED FOR DEVELOPMENT APPLICATION	07.04.21	HHC	JDL
B	ISSUED FOR DEVELOPMENT APPLICATION	26.03.21	HHC	JDL
A	ISSUED FOR RMS APPROVAL	12.02.21	HHC	JDL
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Drawing Notes

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1:1000 A3

PRELIMINARY
NOT FOR CONSTRUCTION

MGA mAHD

CONSULTANT
Stantec

Client
AMPOL

Project
REDEVELOPMENT OF HIGHWAY SERVICE CENTRE PHEASANTS NEST (M31)

Location
M31 HUME HIGHWAY
PHEASANTS NEST, NSW 2574
SOUTHBOUND

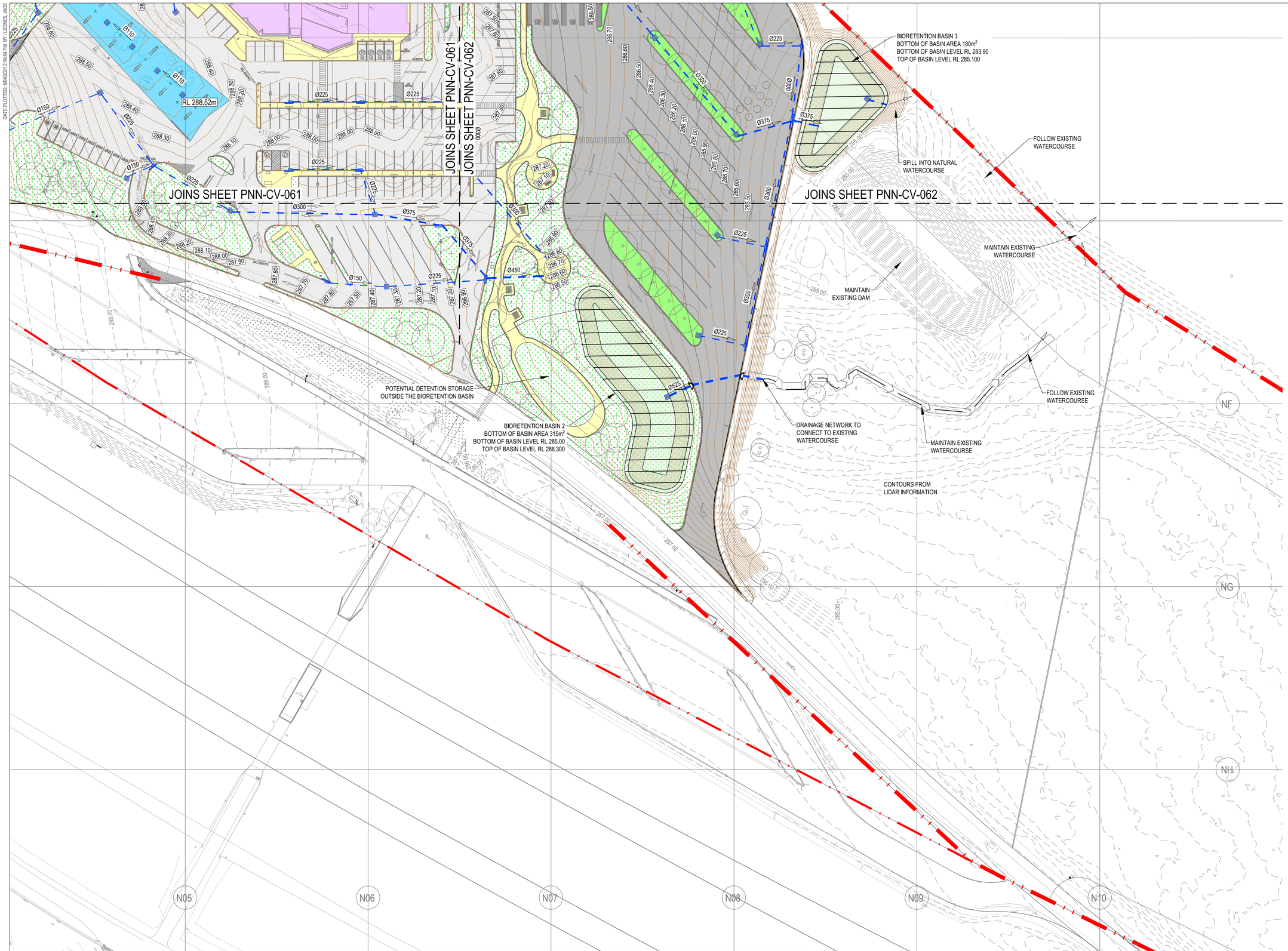
Scale @ A1: 1:500
Project Number: 301350044

Drawing
GENERAL ARRANGEMENT PLAN SHEET 2 OF 2

Project Code	Discipline code	Drawing Number	Issue
PNS	CV	062	F

File Name: PL8303851-PNS-CV-061.DWG

DATE PLOTTED: 8/04/2021 2:10:54 PM BY: LEONES, JADE



LEGEND

- PROPOSED SITE BOUNDARY
- PROPOSED BUILDING
- PROPOSED STORMWATER PIPE
- PROPOSED STORMWATER PIPE (FUEL)
- PROPOSED JUNCTION PIT
- PROPOSED GRATED PIT
- PROPOSED KERB INLET PIT
- SWALE
- PROPOSED CONTOURS (0.25m INTERVAL)
- EXISTING CONTOURS (0.25m INTERVAL)
- RETAINING WALL
- LANDSCAPE AREA
- VEGETATED SWALE
- OTHER CONCRETE AREAS (REFER TO ARCHITECT'S DOCUMENTATION)
- BASIN
- OVERLAND FLOW PATH
- PAVEMENT 1 - RIGID PAVEMENT
- PAVEMENT 2 - FLEXIBLE PAVEMENT
- PAVEMENT 3 - PEDESTRIAN FOOTPATH
- UNDER CANOPY PAVEMENT

Revisions

Issue	Description	Date	Checked	Drawn
D	ISSUED FOR DEVELOPMENT APPLICATION	08.04.21	HHC	JDL

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Drawing Notes

1:500 5 0 5 10 15 20 25 A1
1:1000 A3

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MGA mAHD

CONSULTANT
Stantec

Client
AMPOL

Project
REDEVELOPMENT OF HIGHWAY SERVICE CENTRE PHEASANTS NEST (M31)

Location
M31 HUME HIGHWAY
PHEASANTS NEST, NSW 2574
NORTHBOUND

Scale @ A1: 1:500
Project Number: 301350044

Drawing
GENERAL ARRANGEMENT PLAN
SHEET 3 OF 3

Project Code	Discipline code	Drawing Number	Issue
PNN	CV	063	D

File Name: PL830361-PNN-CV-061.DWG

DATE PLOTTED: 8/04/2021 2:09:23 PM BY: LEONES, JADE

Revisions

Issue	Description	Date	Checked	Drawn
D	ISSUED FOR DEVELOPMENT APPLICATION	08.04.21	HHC	JDL

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1:500 5 0 5 10 15 20 25 A1
1:1000 A3

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CONSULTANT
Stantec

Client
AMPOL

Project
REDEVELOPMENT OF HIGHWAY SERVICE CENTRE PHEASANTS NEST (M31)

Location
M31 HUME HIGHWAY
PHEASANTS NEST, NSW 2574
NORTHBOUND

Scale @ A1
1:500

Project Number
301350044

Drawing
GENERAL ARRANGEMENT PLAN
SHEET 1 OF 3

Project Code	Discipline code	Drawing Number	Issue
PNN	CV	061	D

File Name: PL833951-PNN-CV-061.DWG

DATE PLOTTED: 8/04/2021 2:10:08 PM BY: LEONES, JADE

N07 N08 N09 N10 N11 N12

NA NB NC ND NE

SWALE TO CONNECT TO EXISTING CHANNEL

BIORETENTION BASIN 3
BOTTOM OF BASIN AREA 180m²
BOTTOM OF BASIN LEVEL RL 283.90
TOP OF BASIN LEVEL RL 285.100

FOLLOW EXISTING WATERCOURSE

SPILL INTO NATURAL WATERCOURSE

MAINTAIN EXISTING WATERCOURSE

MAINTAIN EXISTING DAM

JOINS SHEET PNN-CV-061

JOINS SHEET PNN-CV-063

LEGEND

- PROPOSED SITE BOUNDARY
- PROPOSED BUILDING
- PROPOSED STORMWATER PIPE
- PROPOSED STORMWATER PIPE (FUEL)
- PROPOSED JUNCTION PIT
- PROPOSED GRATED PIT
- PROPOSED KERB INLET PIT
- SWALE
- PROPOSED CONTOURS (0.25m INTERVAL) — 285.5
- EXISTING CONTOURS (0.25m INTERVAL) — 285.0
- RETAINING WALL — RW
- LANDSCAPE AREA
- VEGETATED SWALE
- OTHER CONCRETE AREAS (REFER TO ARCHITECT'S DOCUMENTATION)
- BASIN
- OVERLAND FLOW PATH
- PAVEMENT 1 - RIGID PAVEMENT
- PAVEMENT 2 - FLEXIBLE PAVEMENT
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NORTHBOUND

Scale @ A1: 1:500
Project Number: 301350044

Drawing
GENERAL ARRANGEMENT PLAN
SHEET 2 OF 3

Project Code	Discipline code	Drawing Number	Issue
PNN	CV	062	D

File Name: PL833561-PNN-CV-061.DWG

Design with
community in mind

Level 6, Building B
207 Pacific Highway
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